

WHAT IS CLAIMED IS:

- 1 1. A method for determining the thickness of a wall of a
2 graphic model, comprising:
3 loading a graphic model;
4 generating a surface mesh on the faces of the model;
5 generating an internal body topology of the graphic
6 model, corresponding to the surface mesh;
7 identifying a first element in a first wall side of
8 the graphic model
9 traversing the internal body topology to identify a
10 second element in a second wall side of the
11 graphic model;
12 measuring the distance between the first element and
13 the second element; and
14 storing a wall thickness, the wall thickness
15 corresponding to the measured distance.
- 1 2. The method of claim 1, wherein the internal body
2 topology is a 3D volume meshing, tetrahedron-type
3 topology.
- 1 3. The method of claim 1, wherein the internal body
2 topology is a 3D grid mapping.
- 1 4. The method of claim 3, wherein the traversal direction
2 is along the normal vector of the mesh element using
3 the 3D grid mapping topology for efficient searching.

- 1 5. The method of claim 3, wherein the traversal range is
2 guided by the normal vector of the mesh element and is
3 within a range of angles using the 3D grid mapping
4 topology for efficient searching.
- 1 6. The method of claim 1, wherein the mesh points are
2 projected onto the faces to achieve accurate results.
- 1 7. The method of claim 1, further comprising adding
2 sampling points to the surface mesh for more accurate
3 results.
- 1 8. The method of claim 3, wherein the internal body
2 topology is represented as cubes, and is maintained by
3 a tree structure to perform efficient searching.

- 1 9. A method for determining the thickness of a wall of a
2 graphic model, comprising:
3 identifying a first element in a surface mesh of a
4 model;
5 projecting the first element onto a face of the model
6 to identify a first projected point;
7 determining a face normal direction at the projected
8 point;
9 searching for a second element in the surface mesh of
10 the model;
11 identifying the second element in the surface mesh of
12 the model;
13 projecting the second element onto a face of the model
14 to identify a second projected point; and
15 determining the distance between the first element and
16 the second element.
- 1 10. The method of claim 9, wherein the searching is
2 performed from the first element and in the face
3 normal direction.

1 11. A data processing system having at least a processor
2 and accessible memory, comprising:
3 means for loading a graphic model;
4 means for generating a surface mesh on the faces of
5 the model;
6 means for generating an internal body topology of the
7 graphic model, corresponding to the surface mesh;
8 means for identifying a first element in a first wall
9 side of the graphic model
10 means for traversing the internal body topology to
11 identify a second element in a second wall side
12 of the graphic model;
13 means for measuring the distance between the first
14 element and the second element; and
15 means for storing a wall thickness, the wall thickness
16 corresponding to the measured distance.

1 12. The data processing system of claim 11, wherein the
2 internal body topology is a 3D volume meshing,
3 tetrahedron-type topology.

1 13. The data processing system of claim 11, wherein the
2 internal body topology is a 3D grid mapping.

1 14. The data processing system of claim 13, wherein the
2 traversal direction is along the normal vector of the
3 mesh element using the 3D grid mapping topology for
4 efficient searching.

- 1 15. The data processing system of claim 13, wherein the
2 traversal range is guided by the normal vector of the
3 mesh element and is within a range of angles using the
4 3D grid mapping topology for efficient searching.
- 1 16. The data processing system of claim 11, wherein the
2 mesh points are projected onto the faces to achieve
3 accurate results.
- 1 17. The data processing system of claim 11, further
2 comprising means for adding sampling points to the
3 surface mesh for more accurate results.
- 1 18. The data processing system of claim 13, wherein the
2 internal body topology is represented as cubes, and is
3 maintained by a tree structure to perform efficient
4 searching.

1 19. A data processing system having at least a processor
2 and accessible memory, comprising:
3 means for identifying a first element in a surface
4 mesh of a model;
5 means for projecting the first element onto a face of
6 the model to identify a first projected point;
7 means for determining a face normal direction at the
8 projected point;
9 means for searching for a second element in the
10 surface mesh of the model;
11 means for identifying the second element in the
12 surface mesh of the model;
13 means for projecting the second element onto a face of
14 the model to identify a second projected point;
15 and
16 means for determining the distance between the first
17 element and the second element.

1 20. The data processing system of claim 19, wherein the
2 searching is performed from the first element and in
3 the face normal direction.

- 1 21. A computer program product tangibly embodied in a
2 machine-readable medium, comprising:
3 instructions for loading a graphic model;
4 instructions for generating a surface mesh on the
5 faces of the model;
6 instructions for generating an internal body topology
7 of the graphic model, corresponding to the
8 surface mesh;
9 instructions for identifying a first element in a
10 first wall side of the graphic model
11 instructions for traversing the internal body topology
12 to identify a second element in a second wall
13 side of the graphic model;
14 instructions for measuring the distance between the
15 first element and the second element; and
16 instructions for storing a wall thickness, the wall
17 thickness corresponding to the measured distance.
- 1 22. The computer program product of claim 21, wherein the
2 internal body topology is a 3D volume meshing,
3 tetrahedron-type topology.
- 1 23. The computer program product of claim 21, wherein the
2 internal body topology is a 3D grid mapping.
- 1 24. The computer program product of claim 23, wherein the
2 traversal direction is along the normal vector of the
3 mesh element using the 3D grid mapping topology for
4 efficient searching.

- 1 25. The computer program product of claim 23, wherein the
2 traversal range is guided by the normal vector of the
3 mesh element and is within a range of angles using the
4 3D grid mapping topology for efficient searching.
- 1 26. The computer program product of claim 21, wherein the
2 mesh points are projected onto the faces to achieve
3 accurate results.
- 1 27. The computer program product of claim 21, further
2 comprising instructions for adding sampling points to
3 the surface mesh for more accurate results.
- 1 28. The computer program product of claim 23, wherein the
2 internal body topology is represented as cubes, and is
3 maintained by a tree structure to perform efficient
4 searching.

1 29. A computer program product tangibly embodied in a
2 machine-readable medium, comprising:
3 instructions for identifying a first element in a
4 surface mesh of a model;
5 instructions for projecting the first element onto a
6 face of the model to identify a first projected
7 point;
8 instructions for determining a face normal direction
9 at the projected point;
10 instructions for searching for a second element in the
11 surface mesh of the model;
12 instructions for identifying the second element in the
13 surface mesh of the model;
14 instructions for projecting the second element onto a
15 face of the model to identify a second projected
16 point; and
17 instructions for determining the distance between the
18 first element and the second element.

1 30. The computer program product of claim 29, wherein the
2 searching is performed from the first element and in
3 the face normal direction.